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Abstract

In this paper, we exploit the nonlinear property of SiC multilayer devices under UV irradiation to design an optical processor for error detection and correction that enable reliable delivery of spectral data of four-wave mixing over unreliable communication channels.

The SiC optical processor for error detection and correction is realized by using a SiC pin/pin photodetector with UV biased optical gating elements. The operational principle is discussed. Simulation results confirming the described method are presented and compared with experimental results. The relationship between the optical inputs and the corresponding digital output levels is established.

Data shows that the optical bias act as selector that pick one or more states by splitting portions of the input multi optical signals across the front and back photodiodes. Boolean operations such as exclusive OR and three bit addition are demonstrated optically with a combination of such switching devices. The design of an optical full-adder is presented. Additional parity logic operations are performed and checked for errors together. As an example we describe an all optical processor for error detection and correction and then, provide an experimental demonstration of this fault tolerant reversible system. An intuitive representation with a 4 bit original string color message and the transmitted 7 bit string, the parity matrix, the encoding and decoding processes and the design of SiC syndrome generators are presented.

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Thermoelectrical Properties and Surface Morphology of Iron(II) Complexes with Conjugated Multidonor Ligands

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